

## **Research Into Practice** **Knowledge Network Overview** featuring the Potty Training Example

**4/25/2012**  
**Office of Federal High-Performance**  
**Green Buildings**



Research too often sits in technical journals, rather than in the hands of the people who can actually use it.

Move what we KNOW to those who DO



...and back again



Create an **Information Ecosystem** to facilitate the dispersal and adoption of technologies, practices, and strategies focused around sustainable and cost effective building operations.

# Or put more simply...

getting the **right information** to the **right people** at the **right time** to embed sustainability in building design and operations.

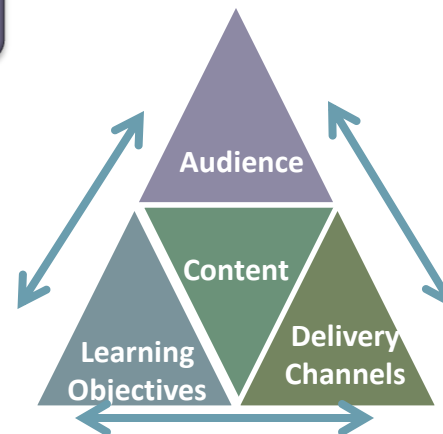
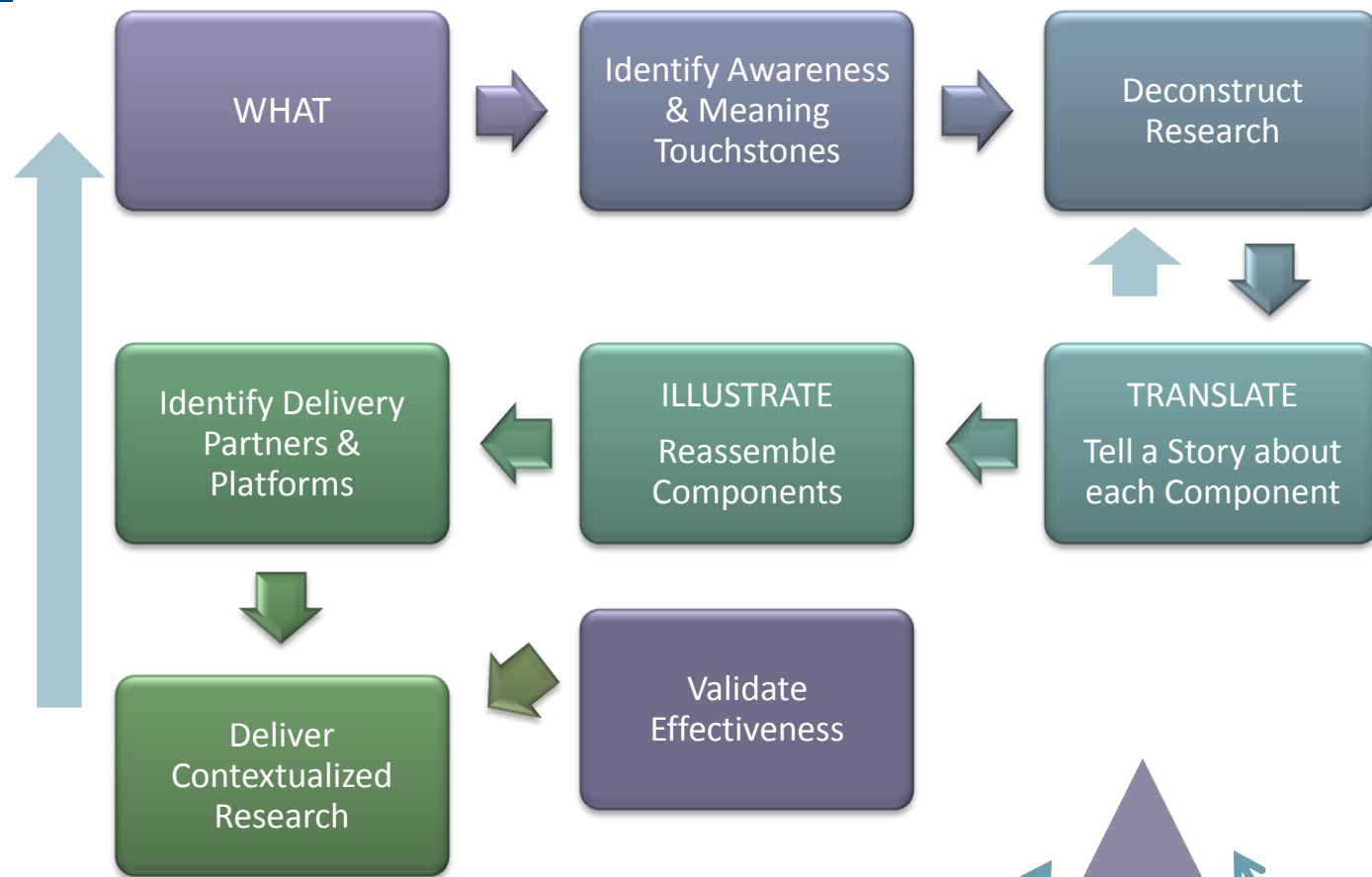


.....is a method:

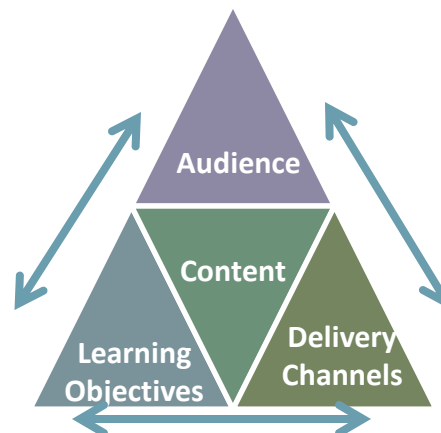
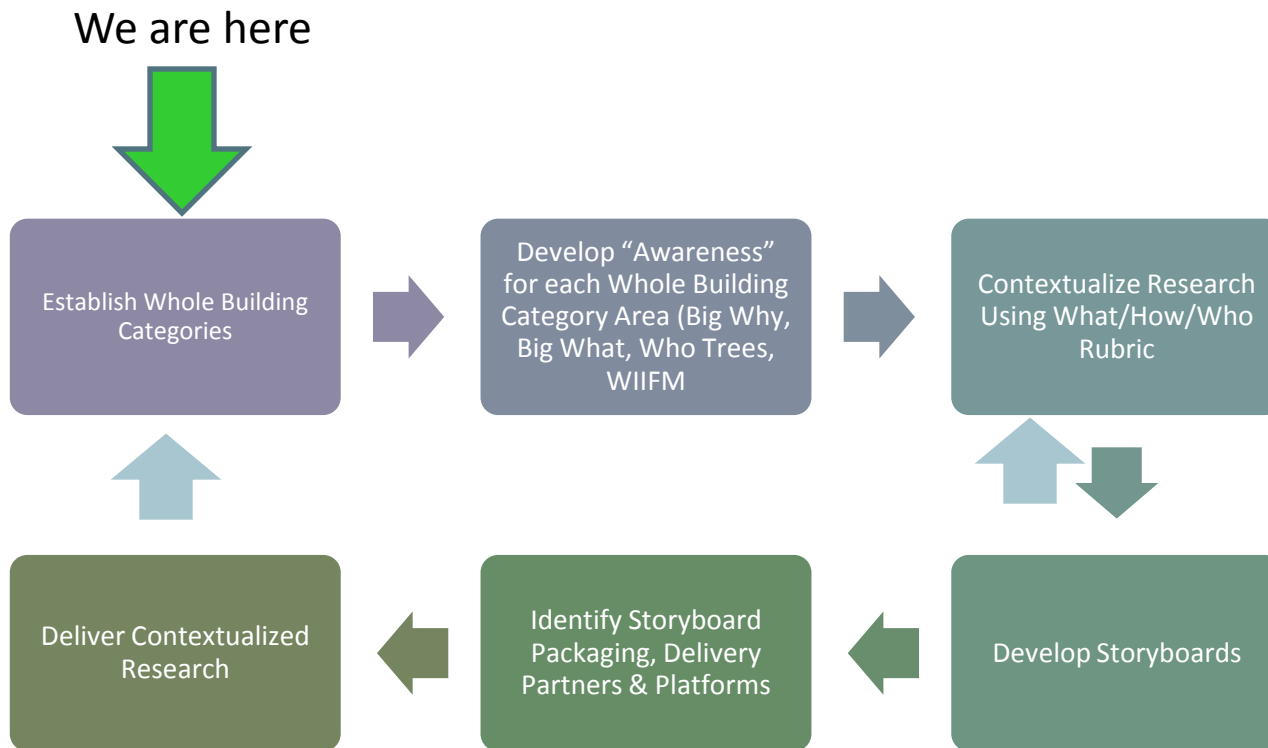
**To contextualize and deliver research**

- for building managers and financial decision makers**
- to implement integrated solutions**
- that achieve continuous high performance in buildings**

# Alternate Knowledge Network Development Process



# The Knowledge Network Development Process







Operations and Maintenance



Water



Energy



IEQ



Resources / Materials

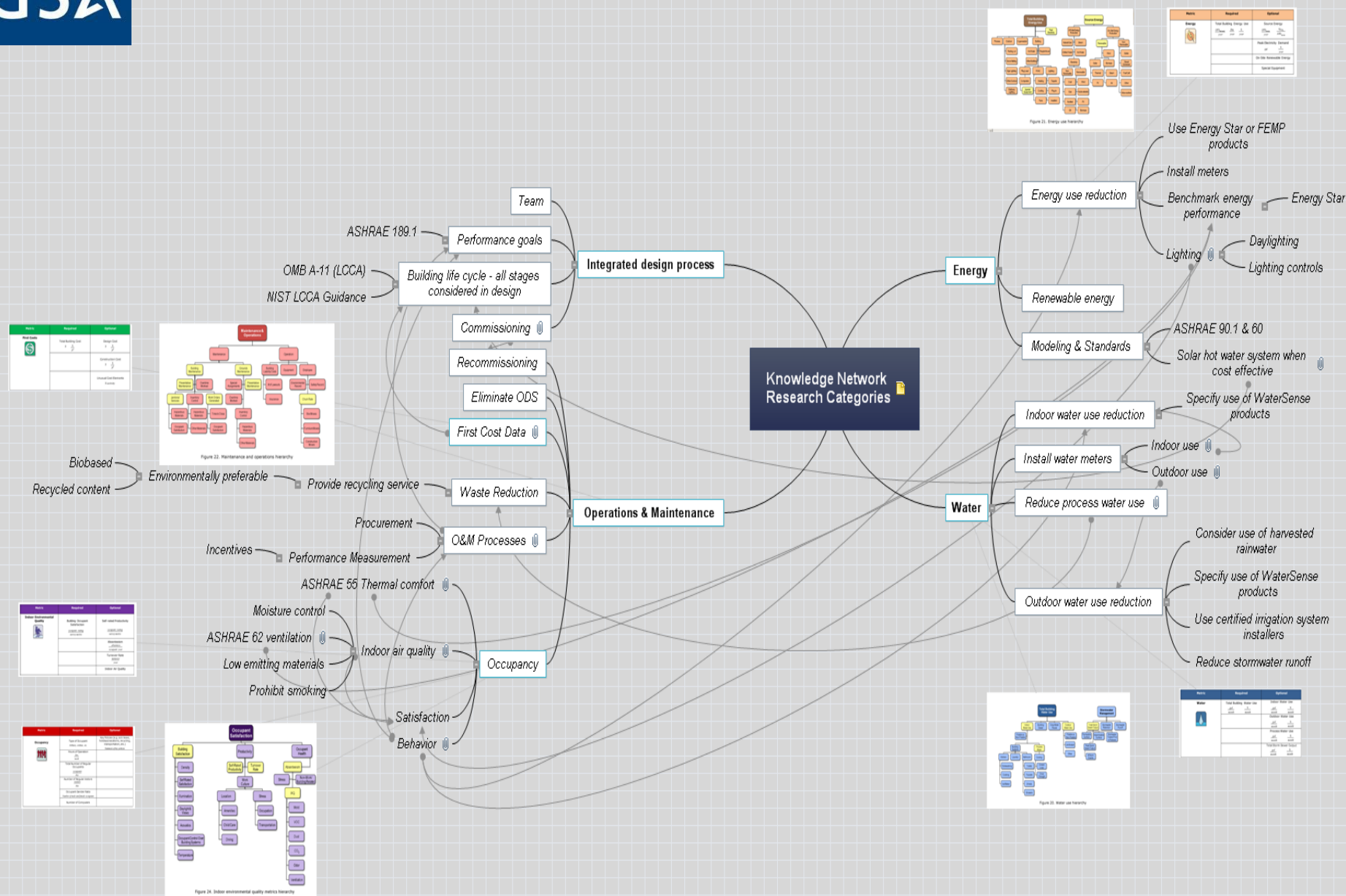


Transportation

Guiding Principles	
Existing Buildings	
Site	
I	Reduce stormwater runoff
Water	
M	Indoor water use reduction
I	Installation of water meters is encouraged
C	Outdoor water use reduction (measured option exists)
I	Reduce process water when life cycle cost effective
I	Specify WaterSense products
I	Use certified irrigation system installers when available
Energy	
M	Energy use reduction (options exist for a calculation method)
I	Use EnergyStar or FEMP products when available
I	Renewable energy
I	Install meters
M	Benchmark energy performance
I	Commissioning/Re-Commissioning
Indoor Environment	
I	Meet ASHRAE 55
I	Meet ASHRAE 62.1
I	Moisture Control
C	Daylighting
M	Lighting controls
I	Use/Specify low emitting materials
I	Integrated Pest Management
I	Moisture Control
I	Prohibit smoking
Resources/Materials	
I	Specify recycled content materials
I	Specify biobased content materials
I	Specify environmentally preferable materials
I	Provide recycling services
M	Eliminate use of ozone depleting substances



## Knowledge Network Research Categories



Feature	Requirement	Verification
Green Building	Green Building Code	Green Building Code
		Green Building Code
		Green Building Code

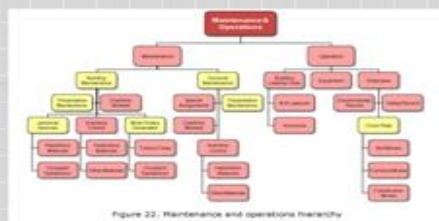


Figure 22: Maintenance and operations hierarchy

Biobased  
Recycled content

Environmentally preferable

Provide recycling service

Recommissioning

Eliminate ODS

First Cost Data

Waste Reduction

Operations & Maintenance

Procurement

Incentives

Performance Measurement

O&M Processes

ASHRAE 55 Thermal comfort

Moisture control

ASHRAE 62 ventilation

Low emitting materials

Prohibit smoking

Indoor air quality

Occupancy

Satisfaction

Behavior

Feature	Requirement	Verification
Green Building	Green Building Code	Green Building Code
		Green Building Code
		Green Building Code

Feature	Requirement	Verification
Green Building	Green Building Code	Green Building Code
		Green Building Code
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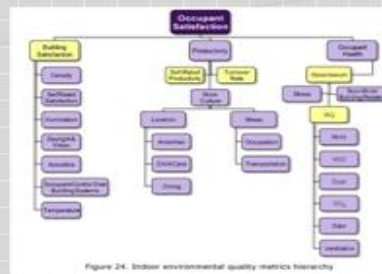
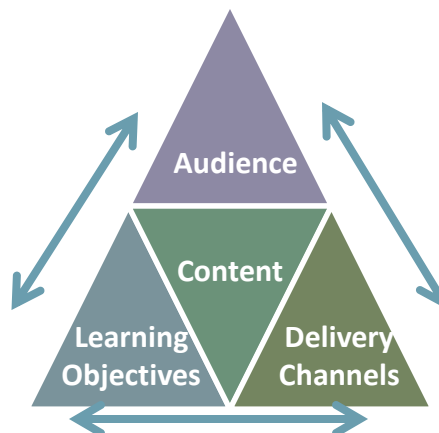
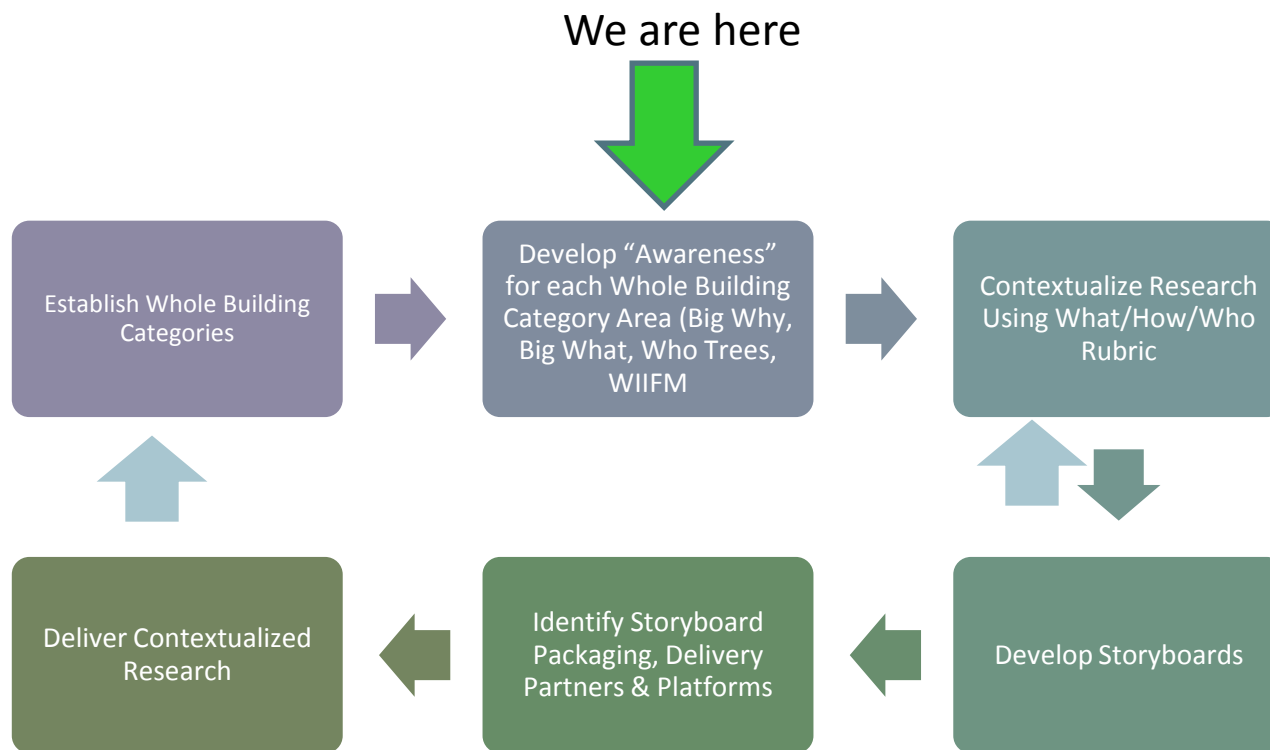


Figure 24: Indoor environmental quality metrics hierarchy

[illegible]

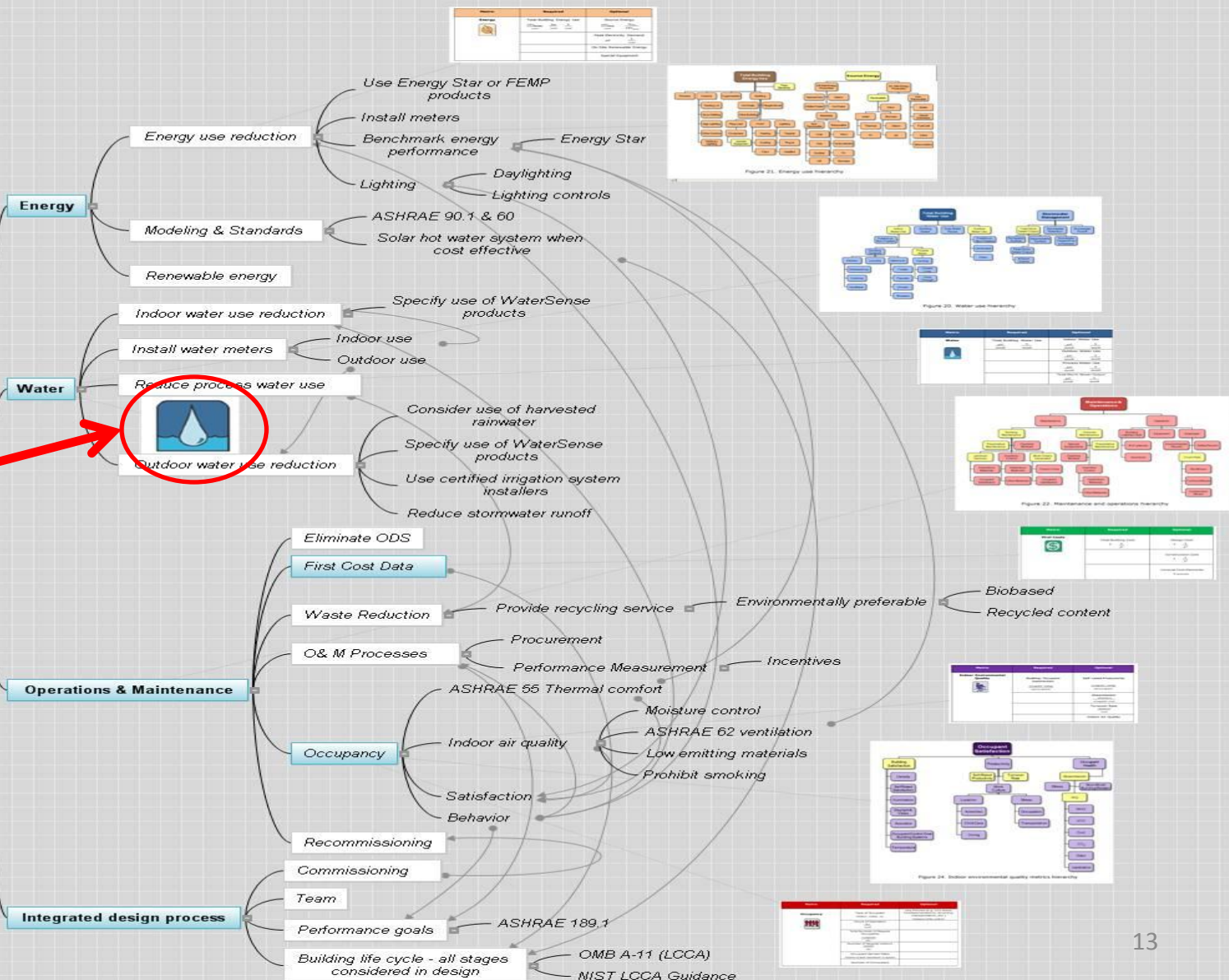
# The Knowledge Network Development Process



# Awareness: Locating the Research Topic within the Network

Research Topic : Indoor Water Use/restrooms/Toilets/Wynkoop Potty Training

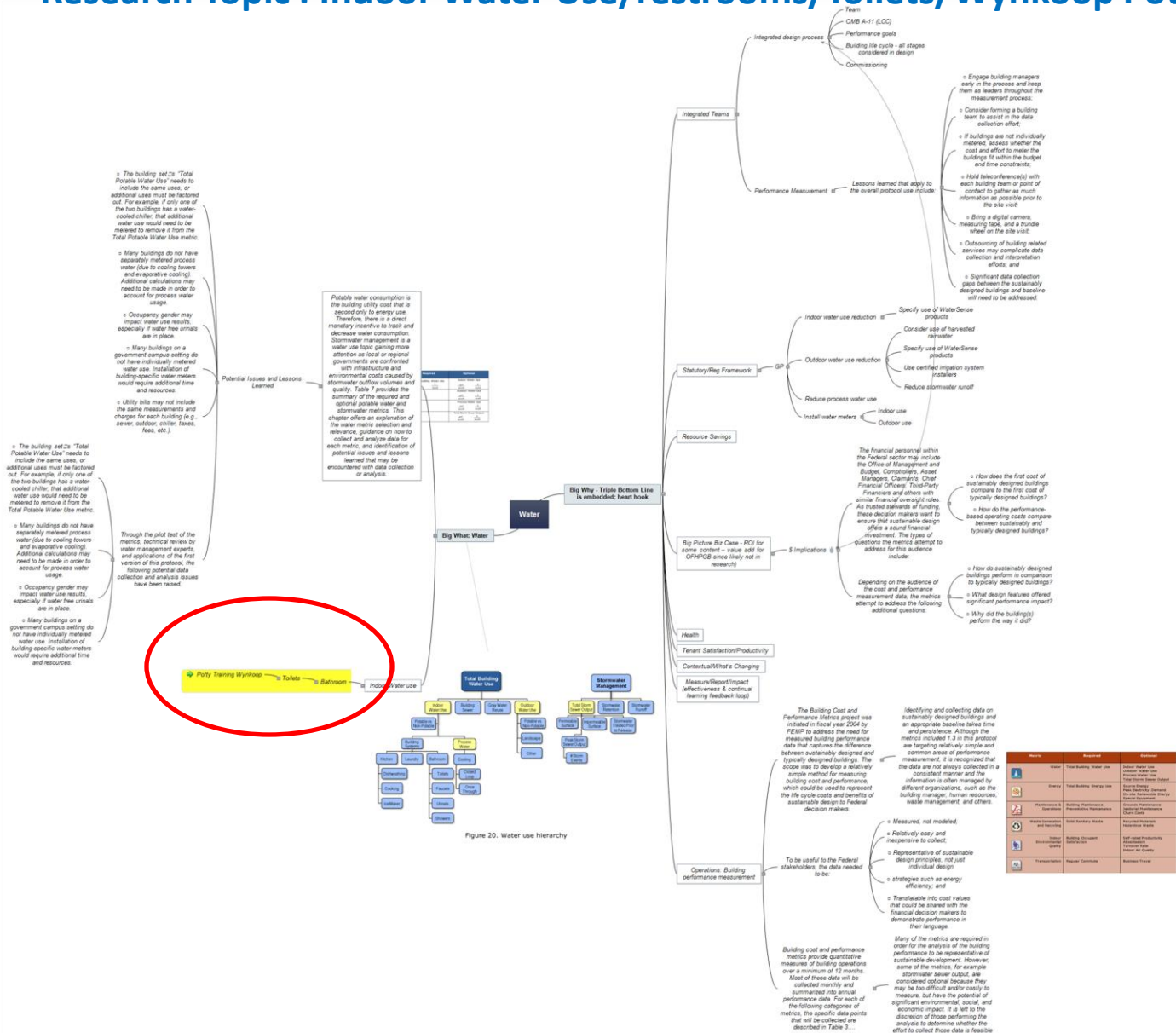
Knowledge Network  
Research Categories





## Awareness – Touchstones Provide Built-in Content

## Research Topic : Indoor Water Use/restrooms/Toilets/Wynkoop Potty Training



# Awareness: Built-in Content Close-Up

## Research Topic : Indoor Water Use/restrooms/Toilets/Wynkoop Potty Training



Potable water consumption is the building utility cost that is second only to energy use. Therefore, there is a direct monetary incentive to track and decrease water consumption. Stormwater management is a water use topic gaining more attention as local or regional governments are confronted with infrastructure and environmental costs caused by stormwater outflow volumes and quality. Table 7 provides the summary of the required and optional potable water and stormwater metrics. This chapter offers an explanation of the water metric selection and relevance, guidance on how to collect and analyze data for each metric, and identification of potential issues and lessons learned that may be encountered with data collection or analysis.

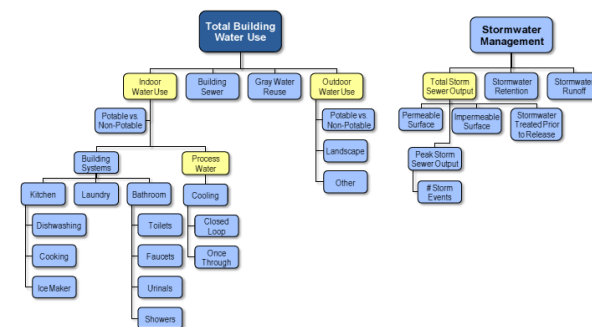


Figure 20. Water use hierarchy

Big What: Water

Indoor Water use

Bathroom

Toilets

Potty Training Wynkoop



# Awareness: The Big Why

Research Topic : Indoor Water Use/restrooms/Toilets/Wynkoop Potty Training

- Integrated Teams
- Statutory/Reg Framework
- Resource Savings
- Health
- Big Picture Biz Case - ROI for some content – value add for OFHPGB since likely not in research)
  - \$ Implications
- Contextual/What's Changing
- Tenant Satisfaction
- Measure/Report/Impact (effectiveness & continual learning feedback loop)
- Operations: Building Performance Measurement

Triple Bottom Line is embedded



# Research: Target Audiences

Research Topic : Indoor Water Use/restrooms/Toilets/Wynkoop Potty Training

## Primary Audiences



**Facility/Building Manager** (Awareness + Mastery)

**Technical Expert** (Awareness + Super User)



**Procurement** (Awareness + Procurement)



**Money Managers\*** (Awareness + \$)

## Secondary Audiences

**Decision Makers** (Awareness + Facility Mgr + \$)

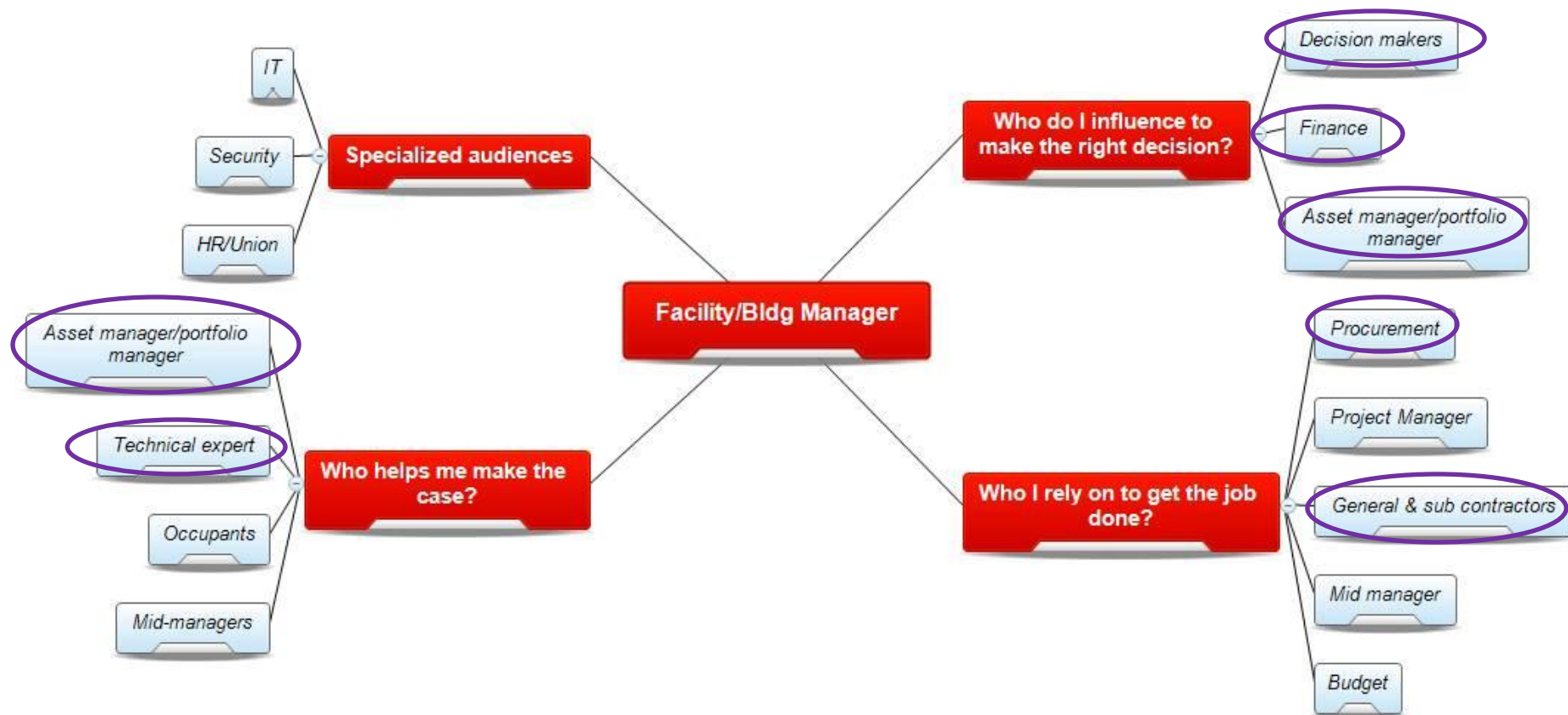
**Project Manager** (Awareness + Facility Mgr + Procurement)

\* The Money Manager Audience includes Finance, Asset Managers & Portfolio Managers

 Primary  Secondary

# Research: Who Tree- Facility/Building Manager

Research Topic : Indoor Water Use/restrooms/Toilets/Wynkoop Potty Training



# Research: Custom Facility/Building Manager Questions

## Research Topic : Indoor Water Use/restrooms/Toilets/Wynkoop Potty Training

- What is important to me to get this job done?
  - Integrated Teams
  - Statutory/Reg Framework
  - Resource Savings
  - Health
  - Big Picture Biz Case - ROI for some content)
    - \$ Implications
  - Contextual/What's Changing
  - Tenant Satisfaction
  - Measure/Report/Impact (effectiveness & continual learning feedback loop)
  - Operations: Building Performance Measurement
- How does this connect to my core responsibilities?
  - Responsible for equipment within a building
- What do I need to know about this Building Category to be successful?
  - Technical Standards
  - Costs
  - Challenges (what if there are no meters)
  - Behavior Interface

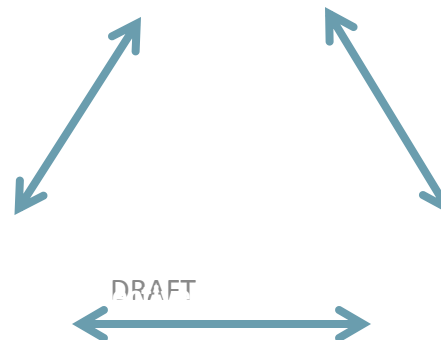
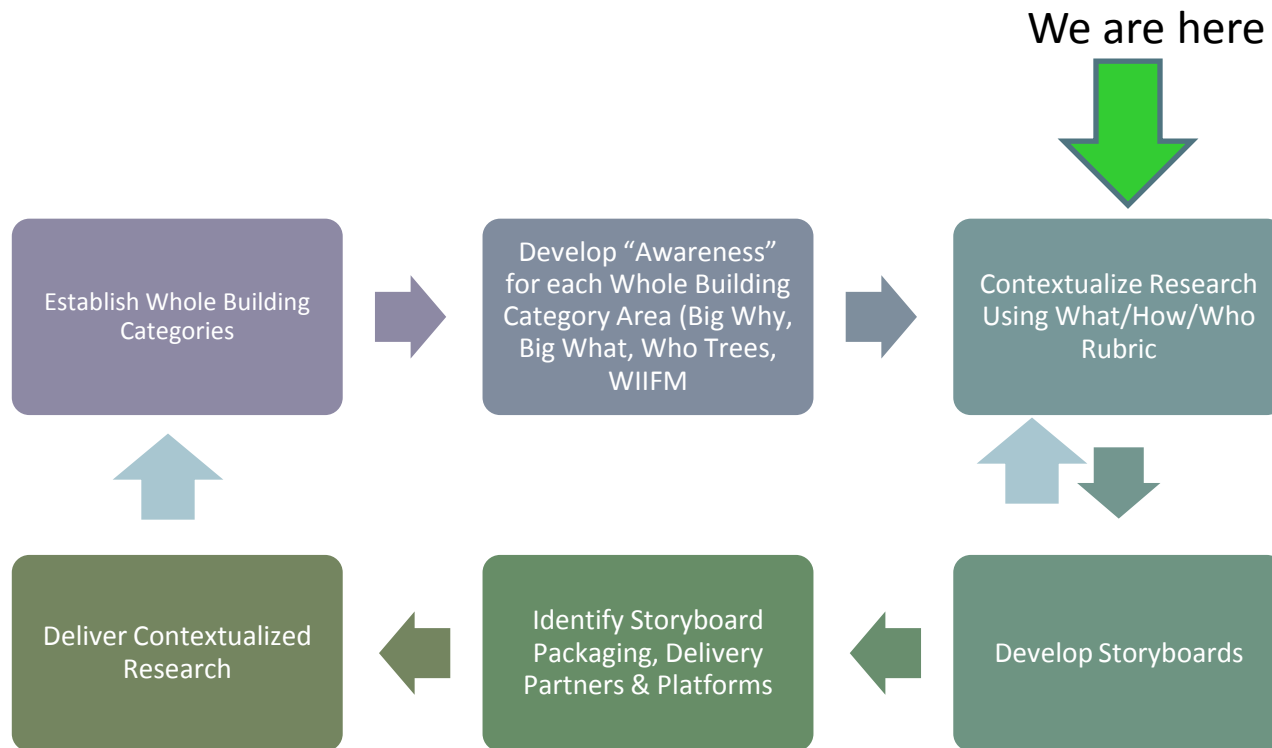
# Research: Who Tree- Procurement

Research Topic : Indoor Water Use/restrooms/Toilets/Wynkoop Potty Training



- What is important to me to get this job done?
  - Integrated Teams
  - Statutory/Reg Framework
  - Resource Savings
  - Health
  - Big Picture Biz Case - ROI for some content)
    - \$ Implications
  - Contextual/What's Changing
  - Tenant Satisfaction
  - Measure/Report/Impact (effectiveness & continual learning feedback loop)
  - Operations: Building Performance Measurement
- How does this connect to my core responsibilities?
  - Shaping procurements
- What do I need to know about this Building Category to be successful?
  - Tech Standards (procurement)

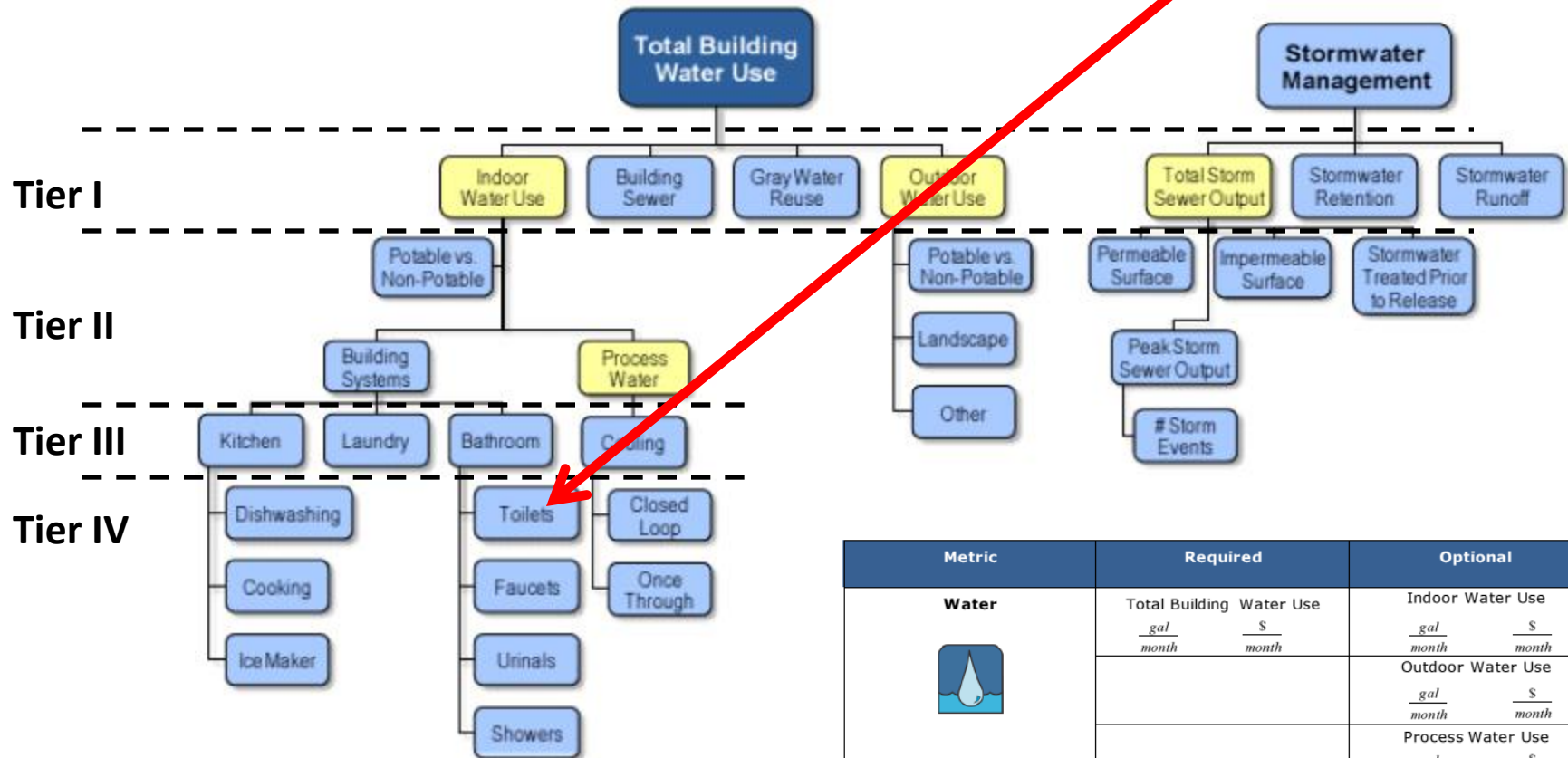
# The Knowledge Network Development Process







We are here



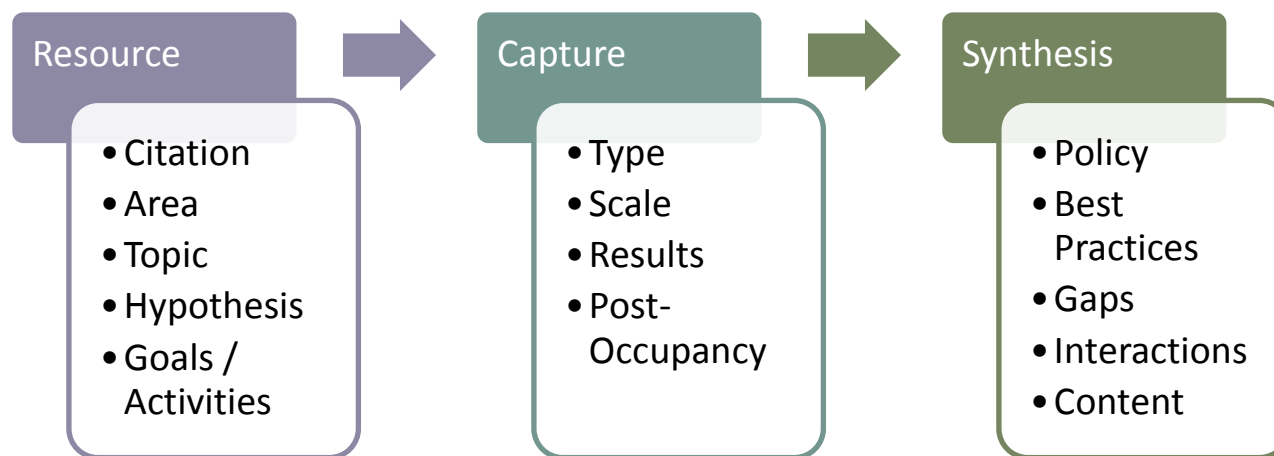
Metric	Required	Optional
<b>Water</b> 	Total Building Water Use $\frac{\text{gal}}{\text{month}}$ $\frac{\text{\$}}{\text{month}}$	Indoor Water Use $\frac{\text{gal}}{\text{month}}$ $\frac{\text{\$}}{\text{month}}$
		Outdoor Water Use $\frac{\text{gal}}{\text{month}}$ $\frac{\text{\$}}{\text{month}}$
		Process Water Use $\frac{\text{gal}}{\text{month}}$ $\frac{\text{\$}}{\text{month}}$
		Total Storm Sewer Output $\frac{\text{gal}}{\text{month}}$ $\frac{\text{\$}}{\text{month}}$

- **Problem:** Why don't we see expected water savings with some dual flush toilet installations?
- **Explanation:** People tend to flush down, but "down" isn't the default water saving direction.
- **Solutions:** Habits are hard to change--Flush handle retrofit; readable signage; attention to specs and more.



## Wynkoop Research and Potty Training Example

- Step 1: Research review template developed



### Synthesis

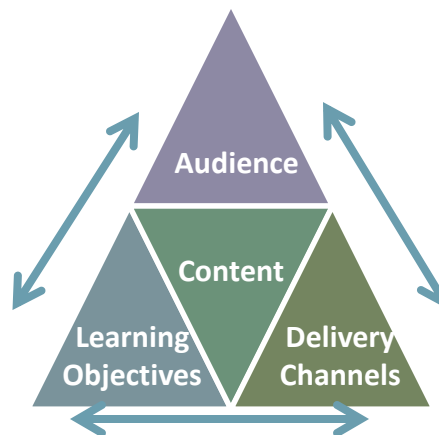
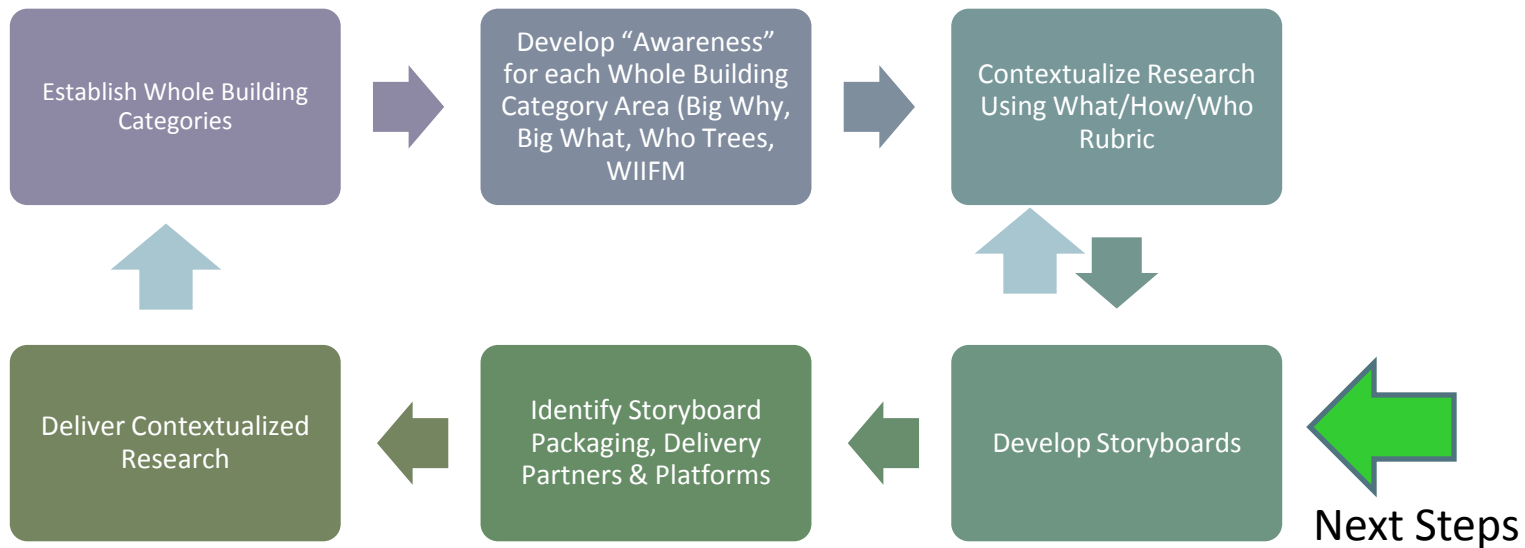
#### Synthesis

- Policy
- Best Practices
- Gaps
- Interactions
- Content

- **Policy:** fixtures perform unconditionally or require performance check (include in commissioning)
- **Best Practice:** design plumbing for easier performance check and differentiate between men's and women's restrooms
- **Gaps/Additional Research:** metering is an expensive diagnostic and piston flapper valve technology may perform better
- **Interactions:** facility / building mgr identified problem, research team specific fixture, and facility / building mgr decided between toilet replace and handle retrofit
- **Behavior:** training occupants on proper use of handle was insufficient
- **Content:** recommend toilet performance specifications and propose model procurement and contract language



# The Knowledge Network Development Process



Tell a story about each component topic that integrates the relevant elements below

✓ Identify how the **problems** (what), **solutions** (how) and **impacts** identified in the research relate to:

a. Behavior: occupants/users

b. Technology: specs, best practices

c. Process: business case, managing people, contracting

d. Integration: impact on other building systems, teams & processes  
(e.g. Water is the second highest energy user in buildings)

✓ What core competencies are required to master the topic?

✓ **Does research include Cost/ROI/payback data? If not, suggest how to add it.**

✓ Note where attention must be paid, where policies and practices might change and where gaps in knowledge or research might be filled.

✓ Suggest strategies to **measure** outcomes & results: How will the target audience know they fixed the problem? (Use Touchstone PNL protocol as base)

\* Storyboard components can be put together in the order that best fits the audience need.



**BILLS REVEAL A BIG PROBLEM****EVALUATED USAGE****POSSIBLE CAUSES**

- ☐ MODELS + ASSUMPTIONS
- ☐ FIXTURES
- ☐ OCCUPANT BEHAVIOR
- ☐ ALL OF THE ABOVE

**WHAT TO CHANGE?**

- ☐ BEHAVIOR
- ☐ TOILET
- ☐ HANDLE





- Questions to help focus packaging:
  - What is the target audience's preferred **form** of information/medium?
  - What is the best way to tell the story so the target audience sees, remembers and uses it?
  - Does the content lend itself to a video?
  - Are there a set of clear Best Practices or Lessons Learned to share?
- Questions to help focus delivery:
  - **Where** does the target audience get their information?
  - Are audience members part of a **profession** that requires certification? (Associations may become delivery partners)
  - Can we partner with an established community of practice with developed content ?

# Packaging, Delivery Channels & Partners

For each target audience:

- Identify the appropriate form in which to package content
- Identify the appropriate channels and partners to transmit information

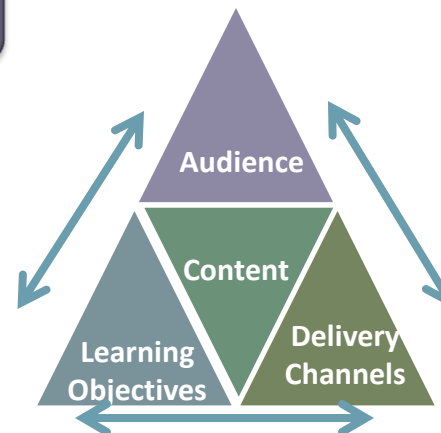
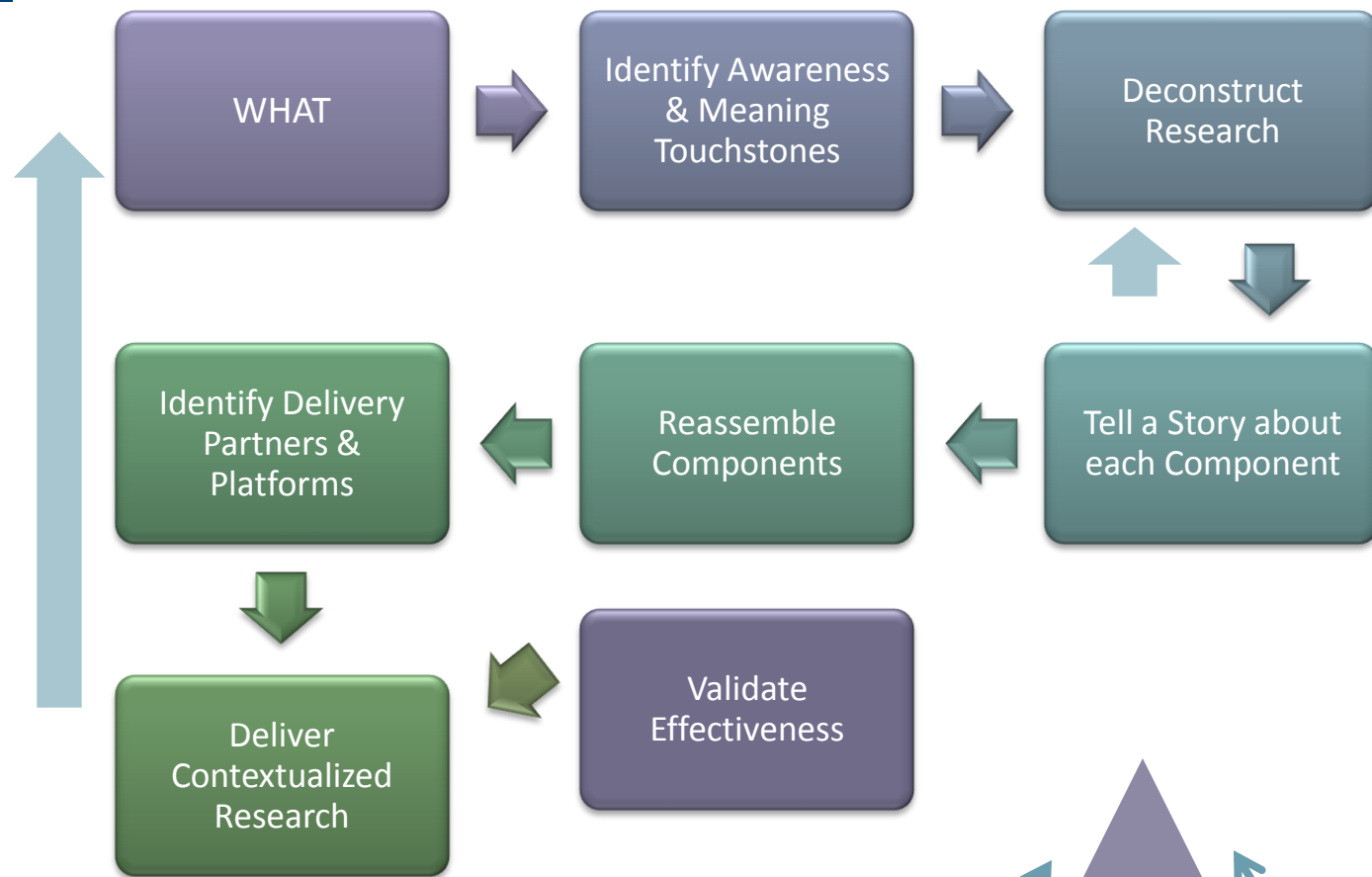
Content Packages		Delivery Channel/Partners	
		Blogs – Focus Group question	Partner
Conference presentations	X	Professional Associations (IFMA, AEE, ASHREA)	Partner
Webinars	X	E-mails/list serves	Partner
One-three page writeups (best practices, case study, barriers & opportunities)	X	Community Colleges/Universities (Carnegie Mellon & CBE)	Partner
Decision Tools/SFTool	X	Websites (DOE, FEMP, FedCenter, NREL)	Partner
You Tube (“How to”) Videos	X	Communities of Practice On-line communities (LinkedIn, Flickr, etc.) What do they currently use? – Focus Group question	Partner
Professional/Trade Journals (print & electronic) CEU / Articles (i.e., Build Green)	X	SFTool*	Delivery channel
Games / Simulations	Potential future	FMI Portal*	Delivery channel
Self-paced interactive web courses- FMI question	Potential future	HPGB WebPage* * OFHPGB Managed Resources	Delivery channel

.....is a method:

**To contextualize and deliver research**

- for building managers and financial decision makers**
- to implement integrated solutions**
- that achieve continuous high performance in buildings**

# Alternate Knowledge Network Development Process





# US General Services Administration

## Research Into Practice Knowledge Network Overview with Potty Training Example

### OFHPGB Team Members:

- Joni Teter
- Judith Heerwagen
- Michael Bloom
- Patrick Dale
- Wanda Hobart

### LMI Team Members:

- Dan Jackson
- Michael Jones
- Jeremy Alcorn

